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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/614,682 | 07/12/2000 | Geoffery Summers | 79,812 | 2174 |

7590 02/25/2003

Naval Research Laboratory Code 1008.2
4555 Overlook Avenue S W
Washington, DC 20375-5320

EXAMINER

NGUYEN, JOSEPH H

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2815

DATE MAILED: 02/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/614,682

Applicant(s)

SUMMERS ET AL.

Examiner

Joseph Nguyen

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 16 December 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al in view of Terrill et al.

Regarding claim 1, Park et al discloses on **figure 4** a bulk CMOS device resistant to total dose radiation failures due to charge build up in a field oxide, the device comprising a Si substrate 2; two or more FETs on said substrate; a field oxide region 4 separating each FET; and wherein a bulk CMOS device does not include an insulator layer beneath said FETs. Park et al does not disclose a negative voltage source for applying a steady back bias to a NMOS region of said substrate to increase the threshold voltage of the field oxide region to reduce leakage currents due to radiation damage in said field oxide region thereby mitigating total dose radiation effects. However, Terrill et al discloses on figure 2 a negative voltage source for applying a steady back bias to a NMOS region of said substrate to increase the threshold voltage of the field oxide region to reduce leakage currents due to radiation damage in said field oxide region thereby mitigating total dose radiation effects. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Park et al by having a negative voltage source for applying a steady

Art Unit: 2815

back bias to a NMOS region of said substrate to increase the threshold voltage of the field oxide region to reduce leakage currents due to radiation damage in said field oxide region thereby mitigating total dose radiation effects for the purpose of obtaining excellent turn off sub threshold and Transconductance characteristics as taught by Terrill et al (col. 1, lines 65-66).

Regarding claims 2-11, Park et al and Terrill et al together disclose all the structures set forth in claims 2-11.

Response to Arguments

Applicant's arguments filed on 12/16/2002 have been fully considered but they are not persuasive.

With respect to claims 1-11, applicant argues that neither Terrill nor Park discloses, "a negative voltage source for applying a steady negative back bias to a NMOS region of said substrate to increase the threshold voltage of the field oxide to reduce leakage currents due to radiation damage in said field oxide thereby mitigating total dose radiation effects". However, Terrill teaches that the voltage threshold voltage for the device can be set and adjusted by applying a suitable back gate voltage to the substrate (col. 2, lines 18-19). Also, the term "to increase the threshold voltage of the field oxide region to reduce leakage currents..." is merely functional language. The combination of Park and Terrill would disclose the structure and steps of method as set forth in the claimed invention and thus it would perform the same function as recited in claims 1-11 thereof. Furthermore, Terrill does not discuss charge build up in the field

Art Unit: 2815

oxide since Terrill's structure does not include a field oxide region, but Park discloses the field oxide region. Therefore, the combination of Park and Terill would teach about this feature.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (703) 308-1269. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for

Art Unit: 2815

the organization where this application or proceeding is assigned is (703) 308-7382 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JN
February 20, 2003

A handwritten signature in black ink, appearing to read 'Eddie Lee', with a large, sweeping initial 'E'.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800